CHANNEL

FILTER BANK ANALYZER

$x(n)$
INPUT

0   $X_0(m)$
1   $X_1(m)$
2   $X_2(m)$
3   $X_3(m)$
k $X_k(m)$
$K-1$ $X_{K-1}(m)$

FIG 1A
(PRIOR ART)

CHANNEL

$\hat{X}_0(m)$ 0
$\hat{X}_1(m)$ 1
$\hat{X}_2(m)$ 2
$\hat{X}_3(m)$ 3
$\hat{X}_k(m)$ k
$\hat{X}_{K-1}(m)$ $K-1$

FILTER BANK SYNTHESIZER

$\hat{x}(n)$
OUTPUT

FIG 1B
(PRIOR ART)

(a)

$x(n)$ — $\otimes$ — $h(n)$ — $\downarrow M$ — $X_k(m)$

$e^{-j\omega_k n}$

FIG 2A
(PRIOR ART)

(b)

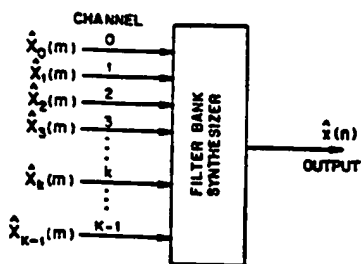$\hat{X}_k(m)$ — $\uparrow M$ — $f(n)$ — $\otimes$ — $\hat{x}_k(n)$
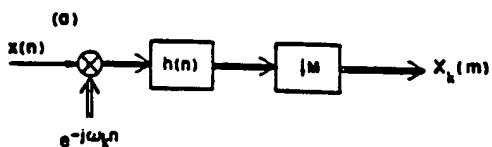
$e^{j\omega_k n}$
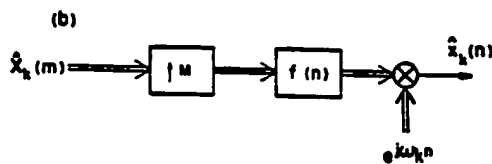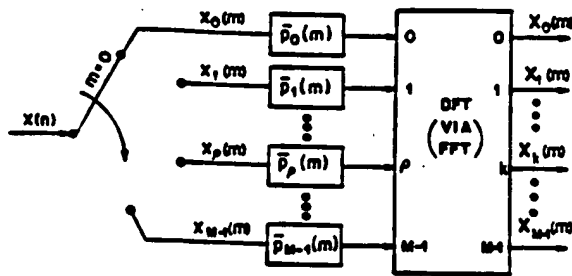
FIG 2B
(PRIOR ART)

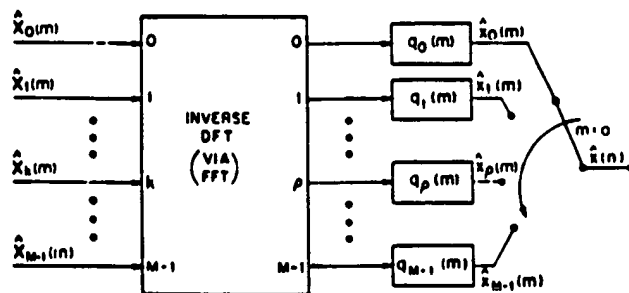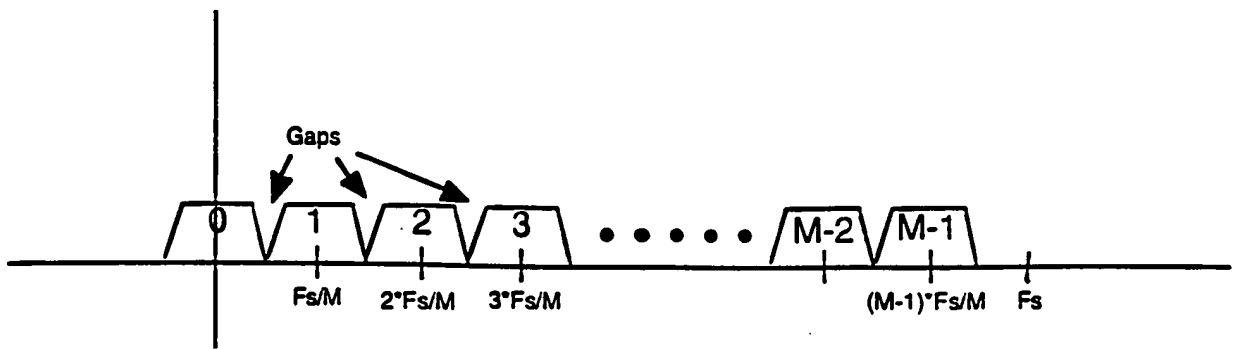FIG 3A
(PRIOR ART)

FIG 3B
(PRIOR ART)

FIG 4
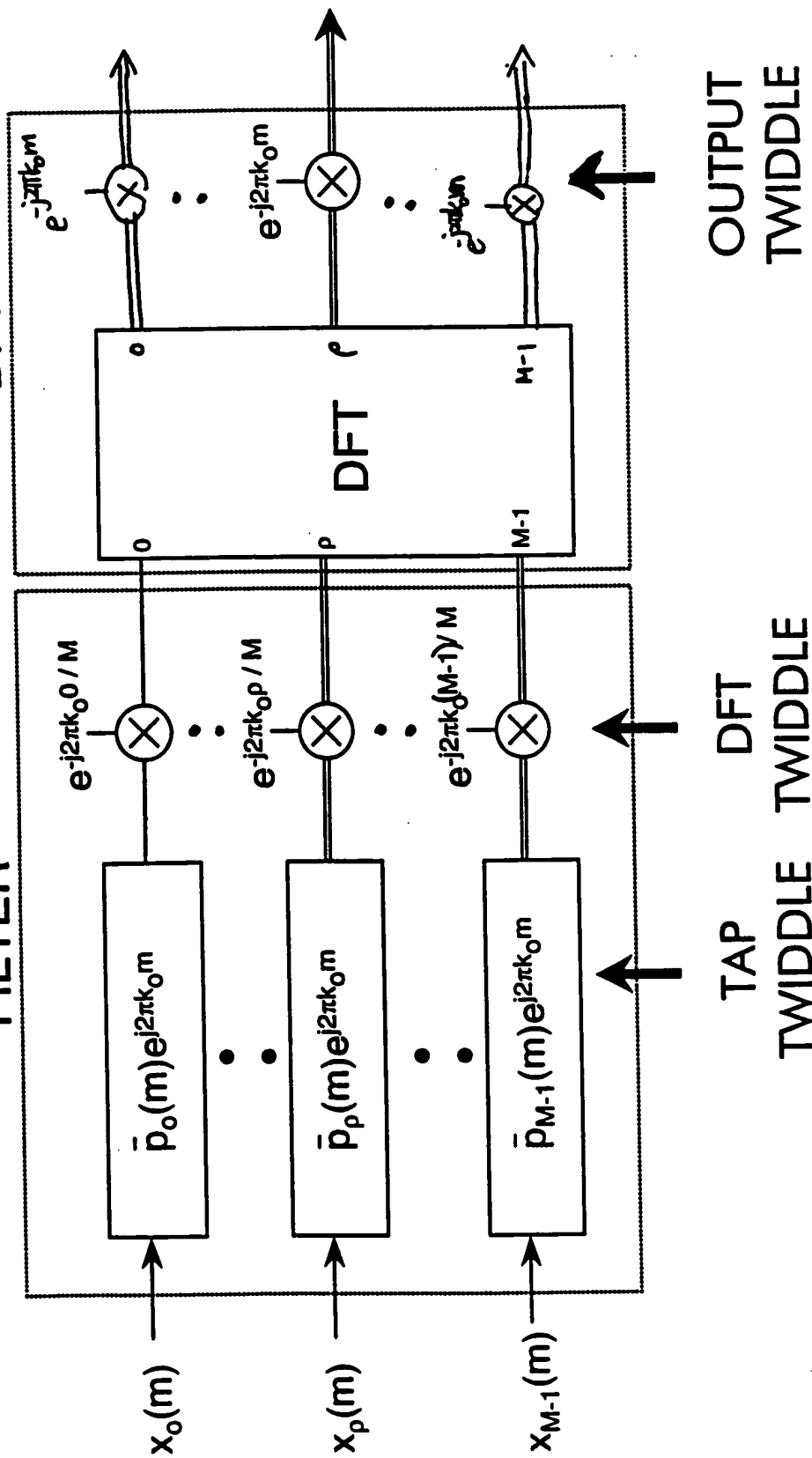(PRIOR ART)

Fig. 5A
(PRIOR ART)

POLYPHASE FILTER
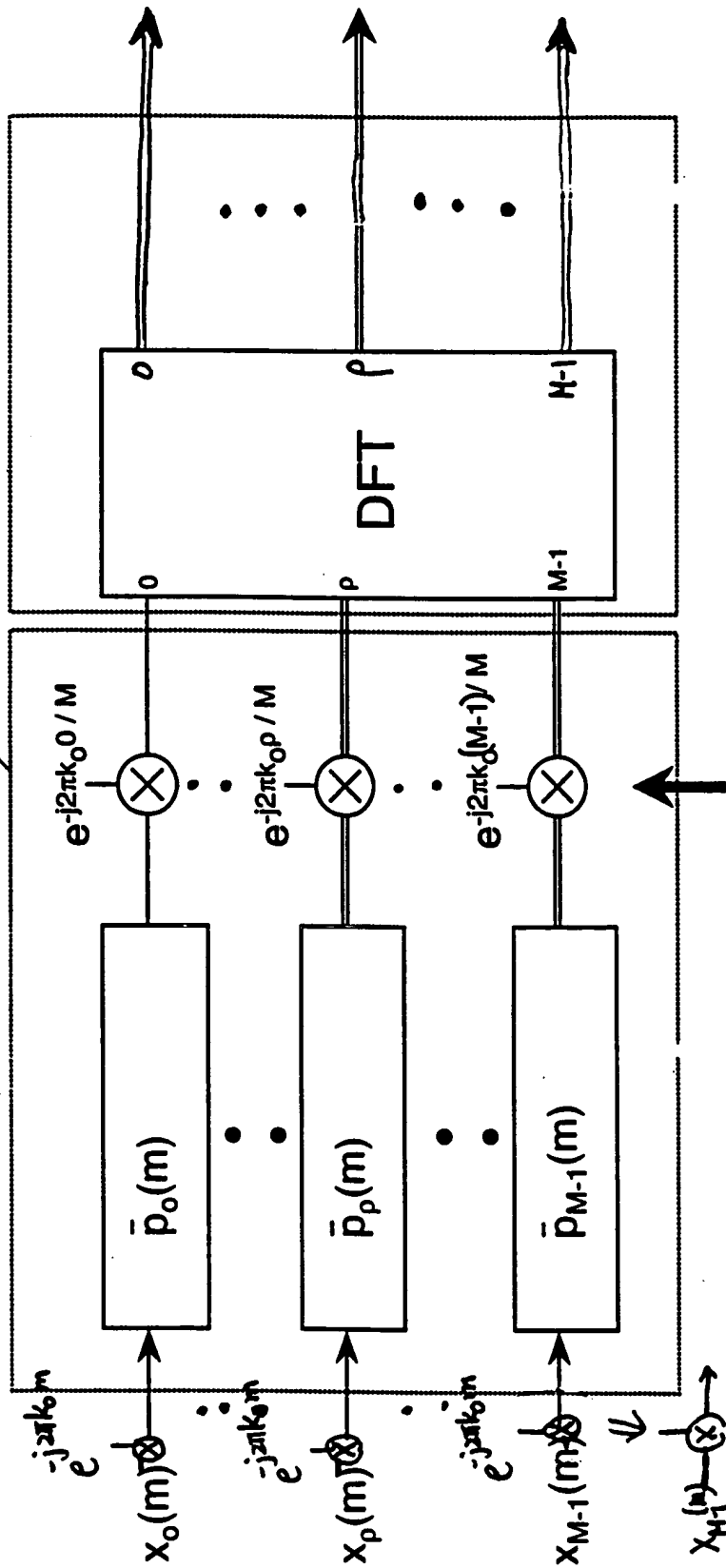
DFT

20

$\bar{p}_o(m)$

$\bar{p}_\rho(m)$

$\bar{p}_{M-1}(m)$

$e^{-j2\pi k_o 0/M}$

$e^{-j2\pi k_o \rho/M}$

$e^{-j2\pi k_o(M-1)/M}$

DFT

0

ρ

M-1

0

ρ

M-1

DFT TWIDDLE

$e^{-j2\pi k_o m}$

$e^{-j2\pi k_o m}$

$e^{-j2\pi k_o m}$

$x_o(m)$

$x_\rho(m)$

$x_{M-1}(m)$

$x_{M-1}(n)$

Fig. 5B

Divide by 2

clk

k_0

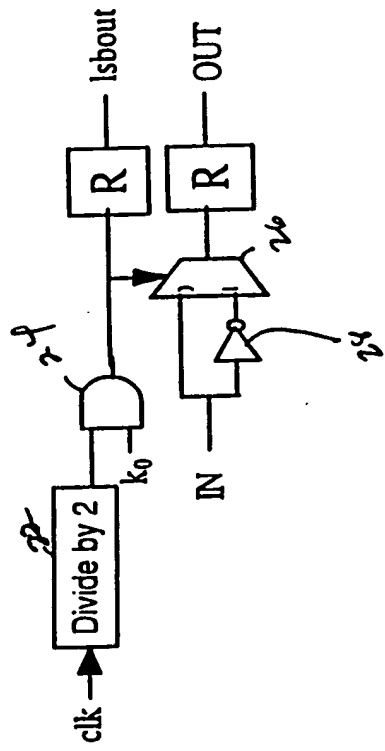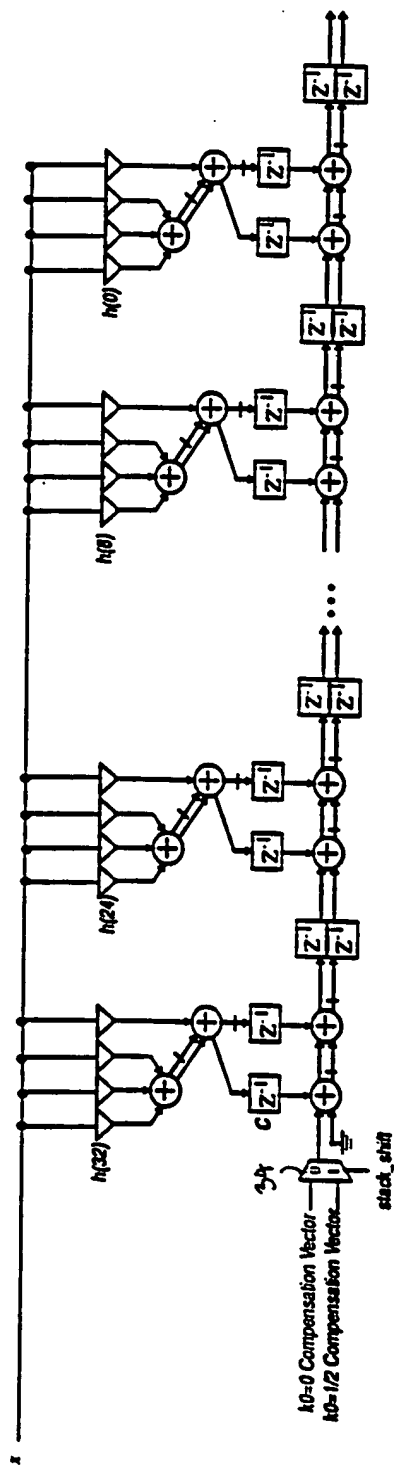lsbout

R

R

OUT

IN

22

24

26

Fig 6

Sample Polyphase Filter Structure

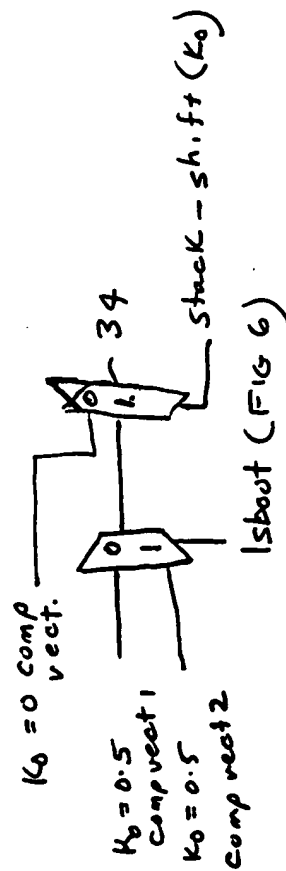Using compensation vector to perform LSB addition of two's complement negation

FIG 7A

FIG 7B